IN THE TITLE:

Please amend the title as follows:

MANAGEMENT OF PACKET SWITCHED CONNECTION IN A ~~MOBILE~~ COMMUNICATIONS NETWORK

IN THE SPECIFICATION:

Please amend the Specification as follows:

On page 1, please replace the paragraph beginning at line 5 with the following:

The present invention concerns connection management in a communications system, especially in a mobile communications system suitable for packet switched data transmission.

On page 3, please replace the paragraph beginning at line 16 with the following:

In the third generation mobile communications system, the radio network subsystem must have information about mobile stations to be served over the radio interface, because the radio network subsystem allocates radio resources for the subscribers and it is able to combine both circuit switched and packet switched connections of the mobile station in the radio interface, using the same ~~hash~~ spreading code when e.g. WCDMA technology is used. It has been proposed that connections over the I_u interface between the radio network and the main trunk should be connection-

oriented due to the said combining and coding of circuit switched and packet switched traffic. In addition, a connection set-up to be made for the packet service allows advantageous transmission to the radio network subsystem of parameters describing the quality of the service (e.g. transmission rate, transmission delay). Without a connection set-up which takes place separately, these parameters must be added separately to each packet to be transmitted. A connection between the serving node and the radio network subsystem can be implemented e.g. with ATM in such a way that for each mobile station a virtual channel is reserved according to a certain ATM adaptation layer (e.g. ATM Adaptation Layer 5 AAL5 or ATM Adaptation Layer 2 AAL2).

On page 5, please replace the paragraph beginning at line 31 with the following:

The objective of this invention is to save limited address space of the transmission network and to save management resources of ~~the radio network subsystem~~ an access system.

On page 5, please replace the paragraph beginning at line 34 with the following:

This objective is achieved by a method and a ~~mobile~~ communications system in accordance with the invention, which are characterized by that which is said in the independent claims. Advantageous embodiments of the invention are presented in the dependent claims.

On page 6, please replace the paragraph beginning at line 3 with the following:

The invention is based on the idea that the logical communication connection between the ~~radio~~ access network and the serving node of the trunk network is released while the data transmission is inoperative, and this communication connection is again set up, when transmission of user data begins. The communication connection between the ~~radio~~ access network and the serving node is released in such a way that the logical connection between the serving node and the ~~mobile station~~ terminal will remain. If said communication connection between the serving node and the ~~radio~~ access network was the ~~mobile station's~~ terminal's last connection, the ~~mobile station~~ terminal will enter a 3 G idle state in accordance with the invention, which corresponds to the idle state of circuit switched services. While the communication connection is released in accordance with the invention, the ~~mobile station~~ terminal keeps the packet data address, whereby a packet data transmission can be started to and from the ~~mobile station~~ terminal. When the packet data transmission begins, a communication connection is again set up between the ~~radio~~ access network and the serving node. In a first embodiment of the invention, the communication connection is released when the inactivity of data transmission has lasted for a predetermined period of time.

On page 6, please replace the paragraph beginning at line 21 with the following:

It is an advantage of this kind of connection management that the limited address space of the transmission network is saved, when the addresses of inactive connections

are freed for other use, and the management resources of the ~~radio network subsystem~~ access system are saved.

On page 7, please replace the paragraph beginning at line 19 with the following:

The present invention can be applied in connection with any suitable ~~mobile~~ communications system. Hereinafter the invention is described more closely by way of example mainly in connection with a digital 3G mobile communications system with the focus on that part of the system which is intended for packet data transmission. Figure 2 shows the simplified structure of a 3G network which was described earlier.

On page 7, please replace the paragraph beginning at line 25 with the following:

In the following, the invention will be described in greater detail in the light of a first embodiment of the invention. Figure 4 is a flow chart of a first embodiment of the method according to the invention, wherein the idleness, that is, the non-activity of a mobile connection is measured by using a timer. At stage 41 a check is made of the non-activity of the user data traffic of a mobile station's communication connection. If no user data is transmitted on the connection, a timer is set at stage 42 at some suitable value, e.g. at zero or at a certain value, and the timer is started. Alternatively, the check at stage 41 can be left out, if the timer is always set and started after transmission and/or reception of a data packet. At stage 43 a check is made to see if the idleness of the connection continues. If user data is transmitted on the connection, the process returns to stage 41 to

monitor the beginning of the idleness of the connection. If the connection is found to be idle in the check made at stage 43, a check is made at stage 44 to see if the timer has achieved the pre-set trigger value. Such a trigger value may be e.g. zero or some suitable value. If the timer has not yet achieved the trigger value, monitoring of the continued idleness of the connection goes on at stage 43. If the timer has achieved the trigger value at stage 44, the mobile station's communication connection between the radio network and the serving node is disconnected at stage 45, and management resources are possibly made free in the radio network, e.g. such records relating to the mobile station that may include information on transmission rate and transmission delay requirements of the service or on frame lengths and ~~hash~~ spreading codes to be used at the radio interface. If one or more circuit switched connection events are taking place at the same time in the mobile station through the mobile services switching centre MSC, the disconnection of the communication connection started by the serving node SGSN will of course not affect the concerned circuit switched connection events. The user data's need for switching is checked at stage 46. When a need occurs to switch user data from the network to the mobile station or from the mobile station to the network, a communication connection is re-established (stage 47). After re-establishment of the connection, the process moves to the beginning of the flow chart to monitor the beginning of a new idleness period of the connection.

On page 11, please replace the paragraph beginning at line 15 with the following:

In a third manner of implementation of the third embodiment of the invention, the serving node SGSN does not accept the change of the MM mobility management state to an idle state from an active state as commanded by the mobile station MS. Such a functionality may be needed e.g. in a situation, where the serving node has transmitted a data packet, of the switching of which the mobile station, however, does not yet know. Hereby the SM protocol will not start any release of the resources of the l_u connection.

On page 11, please replace the paragraph beginning at line 22 with the following:

Figure 7 shows a change of the MM state of the connection as a result of the connection management according to the invention. ~~In accordance with the state of the art, the~~ The mobile connection, which has been changed into the active state in accordance with the state of the art, will go into the 3G idle state in accordance with the invention after the disconnection of the connection at stage 57 of Figure 5. From the 3G idle state the connection goes back to the active state e.g. after the re-establishment of the connection in accordance with stage 59 of Figure 5. A performance of a state-of-the-art PDP Context activation procedure will also return the mobile connection to the active state. Both states, the active state and the 3G idle state, keep the context active in the network.